Abortion, Gas Embolus, And Sudden Death

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■ *In Los Angeles County, almost one-third of abortion deaths are due to gas embolus. Whenever a gas or a gas-producing liquid is injected into a pregnant uterus, a fatal gas embolus is possible because the utero-placental bed is an open avenue to the maternal circulation. The usual sequence of events is collapse, rapidly followed by death. By the time the rescue squad is summoned, the patient is either dead or beyond possibility of resuscitation.*

In the six years 1962-1967 there were 27 gas embolus deaths associated with abortion in the Los Angeles area. All the women were the victims of ignorance or indifference. Wider public knowledge of this lethal danger is the only means by which mortality can be reduced.

THE RISK OF INDUCED abortion depends on the type and severity of its complications and the quality of available medical care. Most complications respond satisfactorily to routine treatment; some require special medical skills, and a few are frequently fatal despite vigorous, expert attention.

Gas embolus ranks high among the lethal complications of abortion. Whenever a gas or frothy fluid is forced into the uterine cavity, the utero-placental bed offers an open avenue to the venous circulation returning to the heart, as well as to the cerebral circulation by way of the paravertebral veins. In this event, sufficient gas (or froth) can rapidly accumulate in the right heart and result in collapse and sudden death. By the time a rescue squad is summoned, the patient is either dead or beyond possibility of resuscitation.

The demonstration of a fatal gas embolus requires a careful autopsy technique. If the heart, vena cava and pelvic veins are opened under water, contained gas can be identified and its volume estimated. When this precaution is not observed, it is possible that significant amounts of gas will be overlooked.

In Los Angeles County, an appreciable number of maternal deaths are due to gas embolus. During the six-year period ended 31 December 1967, 27 deaths were due to gas embolus as demonstrated at autopsy. Twenty-four of the 27 deaths were associated with induced abortions. The remaining three deaths occurred at the 37th week of a normal pregnancy, ten days after curettage for an incomplete abortion, and immediately following a Rubin's tubal insufflation test inadvertently done in early

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TABLE 1.—*Abortion Deaths—Los Angeles County, 1962-1967*

Maternal Deaths—No Abortion		284
Abortion Deaths		83
Infection	44	
Endotoxic Shock	29	
Peritonitis	10	
Clostridia	5	
Emboli	34	
Gas*	24	
Chemical	6	
Blood Clot	1	
Hemorrhage	5	
Miscellaneous	3	
Total Maternal Deaths		367

*Three additional gas embolus deaths were not associated with abortion.

pregnancy. These fatalities represent 29 percent of abortion deaths and 7.4 percent of the total maternal deaths during the six-year period (Table 1).

In California all maternal deaths are carefully investigated, analyzed and categorized by district study committees of the Committee on Maternal and Child Care of the California Medical Association and the California State Department of Public Health.

The material for this study is taken from the records of the District II Committee, which serves Los Angeles County. The committee bases its deliberations on a report of its own investigation plus a review of the autopsy protocol and microscope sections, when available. The most probable cause of death is recorded—irrespective of the cause of death listed on the death certificate. As a final step, the findings of the district committee are forwarded to the state committee for review.

All of the 27 women studied were either found dead, or, if witnesses were present, died rapidly despite various resuscitative measures. In all cases, the right side of the heart was filled with gas. In 18 cases autopsy reports described gas within the vena cava and pelvic veins. In addition, the cerebral vessels of four women contained air. The uteri of 24 women had unmistakable evidence of instrumentation. Another woman was postabortal, and it was known that the remaining two women had visited an abortionist.

The typical woman dying of a gas embolus was 27 years old, Caucasian, the mother of three children, and in the 15th week of pregnancy. The age range was 18 to 36 and the range of parity was zero to seven. Twenty-five of the women were in the sixth to 23rd week of pregnancy, one woman was in the 37th week of pregnancy, and one woman was ten days postcurettage for an incomplete abortion.

TABLE 2.—*Data on Abortionists in 27 Cases of Fatal Gas Embolus*

Unknown	4
Paid Abortionist	7
Friend or Acquaintance	11
Relative	1
Self	3
Physician	1
Total	27

TABLE 3.—*Scene of the Abortion in 27 Cases of Fatal Gas Embolus*

Home	16
Motel	2
Friends' Apartment	3
Abortionists' Home	4
Physician's Office	1
House of Prostitution	1
Total	27

Although motives for abortion can only be inferred, it is known that eight of the women were unmarried and six were either separated from their husbands or divorced. Only one was reported to be happily married. Of some interest is the fact that the husbands of two of the women had had vasectomy.

Identification of the abortionist and the scene of the act lend evidence to the concept that these women were the victims of ignorance or indifference (Tables 2 and 3). Few of the abortionists possessed even a modicum of skill. While the history is often incomplete, the following selected case reports illustrate several methods employed and the sequence of events which immediately preceded death.

Case. 1. During the 13th week of pregnancy, an 18-year-old college student met her boyfriend at his fraternity house. An attempt to introduce a rubber catheter into her uterus failed. Later, a plastic catheter was successfully passed, and the boyfriend blew in a large mouthful of air. The girl clutched her chest, then lapsed into unconsciousness. Mouth to mouth resuscitation and external cardiac massage failed to revive her. As was expected, the pelvic veins, vena cava and right heart were filled with air bubbles. Subsequently, the boyfriend admitted that he had learned this method of abortion from his fellow prisoners while serving time at the Sheriff's Honor Farm.

Case 2. A 33-year-old divorcee discovered herself to be 12 weeks pregnant. After two unsuccessful attempts to locate an abortionist, a friend suggested the purchase of a syringe, a catheter and a

bottle of hydrogen peroxide. With the aid of the friend, the catheter was threaded into her uterus and a bulbful of hydrogen peroxide injected. Convulsions and collapse followed in rapid order. By the time the rescue squads of the police and fire departments arrived, the divorcee was dead. Her iliac veins, vena cava, and right heart contained enormous amounts of gas.

Case 3. A 24-year-old woman had twice been delivered of premature infants by cesarean section. Because of a history of one subsequent proven and several suspected spontaneous abortions, her physician undertook a fertility investigation. Not realizing that the patient was already six weeks pregnant, the physician attempted a Rubin's tubal insufflation test, using oxygen under low pressure. Within seconds, the patient murmured, "It's choking me!" Insufflation was immediately stopped—but too late. Resuscitative efforts included cardiac massage. There was gas in the pelvic veins, iliac veins, vena cava and the right heart. The uterus contained twin fetuses.

Any frothy solution can also produce a gas embolus if a sufficient amount of froth is injected into the venous circulation. The following two cases are dramatic examples of this fact:

Case 4. After $300 had exchanged hands, a 20-year-old unmarried girl was prepared for a procedure on the abortionist's kitchen table. A rubber catheter, a bulb syringe and a bottle of soap solution stood nearby. From the next room, two friends of the victim heard a swishing sound followed by a cry for help. Rushing into the kitchen, they found the girl convulsing. Resuscitation failed. Autopsy findings were: a 12-week gestation, placental separation, and a massive embolus of soap bubbles in the right heart.

Case 5. The husband of a 39-year-old mother of three young children broke open the locked bathroom door to find his wife dead on the floor. It was evident that she had been taking a douche. The coroner's autopsy showed that soapy douche water forced into the uterus had caused extensive separation of a 12-week placenta. In addition, froth filled the vena cava and right heart.

It is also possible to produce a fatal gas embolus in the postpartum or postabortal period. The following case illustrates postabortal gas embolus, and also the fact that an embolus can result from air being blown into the vagina:

Case 6. The husband of a 22-year-old mother of three children returned home ten days after she had undergone curettage for a 20-week incomplete abortion. He had been detained out of state on a burglary charge. After imbibing a considerable amount of alcoholic beverage, the couple retired for the night. In the morning, the husband awoke to find his wife dead at his side. An autopsy showed gas filling the uterine veins, the iliac veins, the vena cava, and the right heart. On questioning, the husband admitted to blowing air into the wife's vagina just before falling asleep.

As previously mentioned, gas is sometimes introduced into the cerebral circulation, presumably by way of the paravertebral veins. Evidently, this mechanism is not likely to result in death. On the other hand, it is possible that a sufficient amount of gas could produce neurologic symptoms. While final proof is lacking, the following nonfatal case might be an example of a cerebral gas embolus:

Case 7. A 21-year-old unmarried student, ten weeks pregnant, consulted an abortionist. After reaching a satisfactory agreement, the abortionist passed a catheter into her uterus. Shortly thereafter, the student "blacked out." An ambulance was summoned. On admission to a hospital, the student was comatose and all the symptoms of right hemiplegia were noted. The spinal fluid was clear. A few hours later, the products of conception passed spontaneously. During the next three days, there was continuous improvement in neurologic findings, ending in a complete recovery of function. When last seen, three years later, she was well.

Douche solutions injected into the maternal venous circulation are also capable of producing collapse followed rapidly by death, but not associated with any evidence of a gas embolus. In this event, the consistent autopsy finding is extensive pulmonary congestion and edema. Other findings are renal congestion with tubular necrosis, hemolysis, and demonstrable douche solution within the uterus and the vascular system. Death is due to acute cor pulmonale. During the period of this study, there were six deaths fitting this category.

These six women ranged in age from 25 to 42 and in parity from one to five. The periods of gestation were from seven to fourteen weeks. The douche solutions employed were soap in four cases, a substance with an odor of pine oil in one and Lysol in one. Four of the six women were dead on arrival at a hospital, one died five minutes after arrival, and one 90 minutes after arrival. The

following three case histories illustrate death in such circumstances.

Case 8. For a fee of $50, two women attempted by means of a syringe and soap solution to induce abortion in a 38-year-old mother of six children. Having failed, they returned three weeks later for a second attempt. The husband, who was home sick in bed, heard a conversation in the bathroom. A few minutes later, one of the abortionists opened the bedroom door and informed the husband that he was wanted. He found his wife dead on the bathroom floor in a puddle of soapy water. An autopsy showed a 14-week fetus, acute pulmonary congestion and edema, and extensive intravascular agglutination and hemolysis.

Case 9. A 31-year-old divorcee, the mother of an 11-year-old son, had accomplished several previous abortions. On this occasion, the order of events was as follows: 3:30 a.m., found lying on the bathroom floor, was helped to bed; 6:00 a.m., collapsed while being helped to an automobile by her landlady; 6:15 a.m., pronounced dead by an ambulance crew. The uterus contained a 14-week fetus as well as soap solution. There was more soapy material in the lungs and the heart, but no air embolus. In addition, there was pronounced pulmonary congestion, edema, coagulation, and fibrin deposition in the pulmonary veins.

Case 10. A 35-year-old woman was living with her four children and common law husband. She had previously been unsuccessful in aborting a seven-week pregnancy by means of turpentine and castor oil. At 10:30 p.m., she awakened her husband, telling him that she had fainted in the bathroom. She was coughing up pink froth. At 12:40 a.m., she was admitted to a hospital, alive but in extreme respiratory distress. Five minutes later she was dead. Her uterus had an odor of chemical disinfectant as well as evidence of instrumentation. Her lungs were filled with edema fluid and there was fluid in the pericardial sac. Later, a bottle of Lysol and a syringe were found in her bathroom.

Discussion

In metropolitan areas such as Los Angeles County, induced abortion is the leading cause of maternal death. While the majority of deaths are due to the complications of infection, a substantial proportion (29 percent in the present series) are the direct result of a gas embolus. Death due to gas embolus is typically sudden, occurring shortly after the injection of either a gas (or a liquid capable of producing gas) into the uterine cavity. Because the utero-placental bed is an open avenue to the maternal circulation, a lethal quantity of gas can easily accumulate in the right heart. By the time resuscitation is started, the patient is either dying or dead.

Other induced abortion deaths can also be directly or indirectly attributed to the injection of various toxic solutions. Soap solution, in particular, is capable of producing fibrin deposition in the pulmonary circulation sufficient to result in pulmonary congestion, pulmonary edema, and death due to an acute cor pulmonale. If the patient does not die immediately, she may die later of renal complications or as the result of infection. If the latter, it is probable that infection gained a foothold through uterus tissue damaged by the solution.

The technique of induced abortion by means of a syringe and a catheter stiffened with a coathanger is common knowledge among the women of California. What they do not fully realize is the danger of this act. Since, in many cases, even the finest of medical care will not avail, it is clear that there should be a more vigorous attempt to educate the public to the possible consequences of this hazardous procedure.

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